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LOCAL TREATMENT OF DISEASES OF THE BRONCHIAL TUBES AND LUNGS.[1]

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THE object of this paper is to describe some of the methods which I have employed in the local treatment of chronic bronchitis, chronic interstitial pneumonia with bronchiectasis, and phthisis pulmonalis, and to give the results which have been obtained.

CHRONIC BRONCHITIS.

This disease has been treated by three principal methods: First, by the direct introduction of coarse spray into the air-passages by means of Sass' spray apparatus; second, by the inhaling apparatus of Dr. George A. Evans; and third, by the pneumatic cabinet.

In the use of the direct spray, the principal indications watched for have been the amount and violence of the cough, the amount and character of the expectoration, and the presence or absence of emphysema and asthma. When the cough is severe and spasmodic, the treatment is usually begun by

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the use of sedative substances, particularly carbolic acid and the fluid extract of hyoscyamus. In using the carbolic acid our custom is first to spray the air-passages with a solution equivalent to that of Dr. Dobell, the formula is:

℞.—Acid. carbol. cryst. . . . ♏xx.
Sodii bibor. . . . . ʒiij.
Sodii phosph. . . . . ʒij.
Glycerini . . . . . ʒi.
Aquæ . . . . . ℥vj.—M.

After first cleansing the nasal passages by the use of this spray, the patient is directed to draw out the tongue and take a deep inspiration, during which the spray is thrown into the pharynx, or directly into the larynx by a bent tube, during two or three successive inhalations. A fifty per cent. solution of carbolic acid in glycerine is then added to the fluid in the flask until the point of tolerance of the patient is reached, and, when as strong a solution as can be borne is obtained, the air-passages are sprayed with this five or six times, the patient always inhaling as deeply as possible. If the necessity for it exists, the nasal catarrh is then treated by such application as seems to be indicated. This method of treatment is repeated every day or every other day, as often as is convenient for the patient, no home treatment being employed, though usually some remedies in the way of tonics or alteratives are used internally at the same time.

By this thorough cleansing and disinfecting of the air-passages, combined with the anæsthetic effect of the carbolic acid, the irritation is usually very markedly allayed, so that for twenty-four hours, at least, after the treatment, the cough is diminished in frequency and violence. The method is not always

efficacious. It is sometimes necessary to rely, to a great extent, upon sedative drugs, particularly at the outset of the treatment, where the spasmodic character is very well marked.

If the treatment by carbolic acid is inefficient, or if the results come about slowly, fluid extract of hyoscyamus may be either added to or substituted for it, the passages being first cleansed and disinfected by means of the alkaline and carbolic acid solution. A spray of hyoscyamus of the strength of about half a drachm to the ounce is introduced, the application being repeated half a dozen times at each sitting. This solution is particularly efficacious where a tendency to asthma exists.

When there is a very copious secretion of mucopurulent matter, stronger astringents have to be employed. The principal of these are tannic acid, the iron salts, and the fluid extract of pinus canadensis. For the use of tannic acid a standard solution is used as the basis.

℞.—Acidi carbol. cryst. . . . ♏xv.
Glyceriti tan. . . . . ʒijss.
Aquæ menth. pip. . . . ʒvss.—M.

After the preliminary step of cleansing and disinfecting, this solution is sprayed directly into the air-passages. When the patient has become accustomed to its effects by one or two inhalations, glycerite of tannin is added to it until it is as thick as it can be and be capable of producing a spray.[1]

[1] The addition of only a very small amount of water is necessary to render the glycerite of tannin sufficiently fluid to produce a spray with a pressure of forty to fifty pounds. Five or six drops of water to a fluid-drachm give a good spray, and ten drops to a drachm make it capable of being sprayed at quite a low pressure—*i. e.*, fifteen or twenty pounds.

This spray is then inhaled five or six times. Its effects are often very salutary, the amount of expectoration decreasing perceptibly after each sitting, though the treatment is immediately followed by an increased expectoration, which lasts for from one to three or four hours.

Of the iron salts, I have most frequently employed the chloride, using a mixture of equal parts of the tincture of chloride of iron and glycerine. This is diluted to about twenty-five per cent. and used in the same way as the tannin. Where great relaxation and an anæmic condition of the mucous membrane exist, it acts better than the tannin solution. A solution of iron alum of the strength of fifteen grains to the ounce may also be used. Pinus canadensis is of service in about the same class of cases as are benefited by tannin, though it has rather more sedative effect than the latter. The preparation usually employed is a mixture of equal parts of Kennedy's white fluid extract and glycerine. The liquid is very heavy and can only be sprayed with a high pressure. To use any of these substances most effectually, it is necessary to have a pressure of from forty to fifty pounds to the square inch. This is obtained by the use of the Crown Gas Engine, manufactured by the National Meter Co., 252 Broadway, New York.

A large tank is connected with the gas engine, which has, by a special contrivance, been converted from a water into an air pump, and the compressed air from the larger reservoir is drawn off into an ordinary office receiver at the convenience of the operator. I usually have a pressure of from fifty to sixty pounds to the square inch in the larger reservoir, and, by means of stopcocks, can regulate the pressure in the small office receiver to which the gas

is attached, according to the requirements of the case under treatment. Where the nasal passages are very much inflamed and tender, and particularly where there is stenosis, which increases the friction to a high degree, it is better not to go beyond thirty pounds at the beginning of the treatment; but when the swelling of the turbinated bodies and septum has been sufficiently reduced to admit of the free access of air or spray, the passages can be much more thoroughly cleansed and disinfected if we use a pressure of from forty to fifty pounds.

I think it possible that one cause of the avowed failure of certain gentlemen who have recently written upon this subject, to treat successfully nasal catarrhs with the spray, is to be found in the low pressure which they have employed in the introduction of the spray into the nostrils. The degree of pressure required in a given case can be determined in two ways. In the first place, by the amount of resistance which the spray encounters in passing through the nose. This is quickly shown by the regurgitation of the fluid through the nostril into which it is introduced, and its failure to pass through and out at the opposite side. The second are the sensations of the patient, though the latter generally depend upon the former.

Where the nostrils are sufficiently patulous to admit the spray readily, so that there is little tendency to friction or the development of high pressure in particular localities of the nose, the pain is usually very slight, and a high pressure may be advantageously employed. But where the stenosis is well marked, and the friction consequently very great, there is a tendency for the fluid to accumulate or to be forced violently into the chamber of the antrum, and the pain is sometimes very severe. Under such

circumstances the preliminary spraying must be done with a very moderate pressure, and if, even then, the spray does not pass readily through the nostrils, it is better to dilate them by the introduction of cocaine, when no further difficulty of the kind will be experienced. I suspect, however, that the cocaine may to some extent interfere with the therapeutic action of the medicinal agents employed, though it does not, of course, lessen the value of the disinfectants.

In the spraying of the larynx and trachea it is always better to use a very high pressure, and the reasons for this are twofold. In the first place, with the high pressure a very large volume of fluid is introduced in a short space of time, so that in a few seconds an ordinary flask, such as is used in these manipulations, may have its contents half exhausted. And in the second place, the forcible impact against the walls of the mouth and pharynx nebulizes it to such an extent that it is more widely diffused in the respiratory passages. Occasionally a drop of the fluid will form upon the end of the spray tube and fall into the trachea, producing a violent fit of coughing; but, with the high pressure, the time occupied in each introduction of the spray may be so shortened that there is very little danger of this accident.

The advantages to be obtained by this method of treatment over the others to be described later on, are that it occupies very much less time, in consequence of the far larger amount of fluid that can be sprayed into the throat during one or two inhalations, and its better cleansing properties. The forcible introduction of the spray directly into the larynx and trachea gives a much more thorough

washing than can be accomplished by the slower methods to be described hereafter.

The treatment of chronic bronchitis by means of the pneumatic cabinet has also been very successful in my hands, as it has in the hands of other gentlemen who have reported their experience with this instrument. The patient is confined in the cabinet under a negative pressure of from two-tenths to five-tenths of an inch. The sitting usually lasts ten minutes, though it may, after the patient has become accustomed to its use, be prolonged to fifteen or twenty minutes. The pneumatic differentiation is accompanied by the inhalation of the spray, for which purpose we employ the "Evans inhaler." The solutions most frequently employed by me are, a twenty per cent. solution of carbolic acid, with borax and glycerine, a solution of the fluid extract of pine needles with iodine, and a combination or mixture of the two solutions in equal parts. When asthmatic breathing is present, the solution of hyoscyamus already referred to is of great value. If much emphysema exists, the cabinet is not indicated. I have never seen any benefit derived from its use in these cases, though I have tried both rarefaction and condensation. The inhalation of the hyoscyamus may relieve the asthmatic breathing, but this may be accomplished just as readily outside the cabinet as in it. In one case a sitting of five minutes in the cabinet developed in a very emphysematous subject, whose breathing was fairly good when he entered the cabinet, a most terrible attack of asthma. The moral effect upon the patient was such that he could never be induced to reënter the box, and promptly transferred himself to the care of another physician. I have frequently seen it increase the asthmatic breathing temporarily in such

subjects, though in others it has produced temporary relief.

The cabinet is particularly valuable in very chronic and intractable cases where the relaxed vessels of the bronchial mucous membrane, though for a time contracted by the action of stimulant applications, soon resume their previous condition of dilatation. The cabinet undoubtedly acts in a twofold manner in these cases: First, as has been pointed out by Dr. Isaac Hull Platt, in a paper read before this Association at its last meeting, by the compression of the bronchial surfaces, and by some alterative effect due, probably, to a combination of the compression with the tonic action upon the vasomotor system of the lungs; secondly, by the action of the spray introduced during treatment. The disadvantage is that, with the spray introduced in this way through the long tube, we do not get the same cleansing effect as can be obtained in the direct method previously described. To obviate this difficulty, I have adopted the practice of first thoroughly cleansing the upper air-passages with the Siss' apparatus before the introduction of the patient into the cabinet.

The apparatus which Dr. George A. Evans introduced to the profession about two years ago has been used in a number of cases with generally satisfactory results. It consists of an ordinary "Wolff" bottle with a glass globe on top, into one side of which is introduced the point of an ordinary spray tube, while from the other emerges a tube for the collection of pulverized spray. It is a modification of the idea of Sales-Giron, and depends upon the principle that when a coarse spray is forcibly thrown against a surface it will be broken up into minute particles and form a fine nebula which will

float in the atmosphere several minutes before being precipitated or evaporated. The grosser part of the spray remains in the globe and falls through a tube, back into the "Wolff" bottle, while the more finely nebulized portion is carried off through the tube of exit, from which it is inhaled by the patient. The mouth-piece consists of a hard rubber tube with an opening on one side, the tube held in the mouth of the patient, and the opening on its side covered by his forefinger during inspiration; during expiration the finger is removed so as to allow the breath and spray to pass out through the side opening. The patient is instructed to make deep and slow inspirations, with the idea of securing, as far as possible, voluntary expansion of the chest. The solutions employed have been about the same as those used in the Sass' spray and the pneumatic cabinet.

The advantages claimed by Dr. Evans for his method are that, first, the patient is compelled to make voluntary efforts at deep inspiration during a space of time ranging from half an hour to an hour. By this means a valuable system of pulmonary gymnastics is put into operation. Second, the spray, very finely nebulized, and introduced directly into the air-passages in great volumes, has a better opportunity of diffusing itself in the residual air, and so reaching deeper into the lungs, than it could do under any other circumstances. Third, by means of the fine nebulization much stronger solutions may be employed than with the ordinary coarse spray. For instance, we have frequently employed a thirty per cent. solution of carbolic acid, a strength which could not be tolerated if applied to the air-passages in a liquid form, but which is easily inhaled by any one who is not extraordinarily sensitive.

The first few inhalations of these strong solutions

occasion some cough, but this soon passes away, and the patient will continue to inhale for a long time without any further disturbance. At the termination of the sitting, the mouth, pharynx, and larynx, are pretty thoroughly anæsthetized, so that a feeling of numbness exists which lasts for an hour or more. Though the volume of spray as it issues from the tube seems very large, hanging as a cloud in the atmosphere of the room for a long time, still very little of the fluid is used up in its formation, and not enough is carried into the respiratory passages to have ever produced any symptoms of carbolic acid poisoning in the patients upon whom we have used it. As the precipitation of the coarse globules of spray has been thoroughly accomplished before it is introduced into the mouth, no fluid is deposited upon the mucous membranes, but they are simply subject to the mild action of the vapor or spray during the time of the sitting, and the spray itself is all thrown out through the mouth and nose. This method of treatment is particularly useful in cases in which the mucous membranes are extremely sensitive, in those accompanied by violent spasmodic cough, and where the disease is of very long standing, and a prolonged application of the medicinal agent is desirable. Its disadvantage is that, as the spray is introduced by no power except the inspiratory suction, it does not come with sufficient force to the mucous membranes to cleanse them thoroughly. But this objection has been overcome, as in the case of the cabinet patients, by thorough preliminary douching with the spray from the Sass' apparatus. By inhaling through the mouth, and exhaling through the nostrils, medication of the nasal as well as the lower air-passages is obtained.

To get the most satisfactory results by this method

it is necessary to employ a high pressure of air. I commonly use a pressure of from fifty to sixty pounds to the square inch. But Dr. Evans, who has a more elaborate apparatus for the compression of air, employs a pressure of seventy to eighty pounds. The advantage consists in the greater volume of spray produced. The inspired air is loaded with it, and during the exhalation it pours from the nostrils in a cloud such as is seen to issue from the nostrils of a horse on a very cold and damp day. Where the membranes are very irritable, and the stronger solutions of carbolic acid are not well borne, a mixture of fluid extract of pine needles with iodine is very serviceable, and, as in the case of the Sass's apparatus, it is frequently combined with an equal portion of a ten or fifteen per cent. solution of carbolic acid. I have also used solutions of tannin with the Evans' inhaler, but the spray is exceedingly disagreeable to the patient, and apt to produce nausea. I have not employed any other astringents with this apparatus.

CHRONIC INTERSTITIAL PNEUMONIA AND BRONCHIECTASIS.

By the local treatment of this affection, three objects are to be accomplished. First, the healing of the bronchial catarrh; second, disinfection of the dilated bronchi; and, third, the restoration of the breathing capacity of such portions of the lung as are not hopelessly degenerated.

The first two objects are best accomplished by the use of the coarse spray or the Evans' inhaler. Each has its advantages, but so far as I am able to judge from my personal experience, the coarse spray is more serviceable.

The third object is to be accomplished through the

use of the pneumatic cabinet, or some other apparatus for the inhalation of compressed air.

The method of treatment is first to wash thoroughly and disinfect the nasal and lower respiratory passages with a coarse spray from the Sass' tube. In the treatment of the lower air passages, a high pressure is necessary, so as to give a large volume of spray, and to project it with great force into the respiratory passages. This is at first productive of violent cough, which clears the secretions from the bronchial tubes, after which the spray is deeply inhaled, penetrating, probably, as low as by any other method. After this preliminary washing, the patient is put into the pneumatic cabinet and subjected to a negative pressure of two- or three-tenths of an inch for from fifteen to twenty minutes, while a mild spray is introduced through the tube in order to keep the mucous membrane of the pharynx moist during the treatment. The application of the pneumatic differential pressure in these cases should be made with the greatest care, as there is danger, if the pressure be too great, of producing emphysema of those portions of the diseased lung which are still accessible to air. For this reason, pressures over half an inch should not be employed. The sitting is made rather longer than in the case of chronic bronchitis, because of the necessity for the use of a lower pressure, and with low pressures, as with mild applications of medicinal agents, a more prolonged use is necessary than where the therapeutic agent is of greater power.

By this combined method of treatment, very brilliant results have been achieved in a number of cases which it is not necessary to detail. In some instances, where the cabinet has not been well borne, or where no manifest results were obtained after a fair trial, the Evans inhaler has been substituted for it with

very gratifying results. In a few cases no benefit has resulted from any local treatment.

PHTHISIS PULMONALIS.

Aside from the effects of climate, there are no means by which we can obtain so much in the treatment of phthisis pulmonalis as by the use of agents, either physical or chemical, which act directly upon the respiratory organs.

In speaking of these local measures of treatment, I shall confine myself to the three which I have already discussed, namely, the coarse spray, the Evans' inhaler, and pneumatic cabinet. In the selection of a method of treatment for these cases, it is necessary to take account of all the conditions present, because that which benefits one case may be useless or positively injurious in another.

The best results are obtained either in the early stages, when the disease is in its incipient form and no extensive excavation exists, or where the process, though considerably further advanced, is still limited to a comparatively small portion of the lung. The use of sprays is beneficial only in so far as we desire to treat the coincident bronchitis, or where cavities connect with bronchi of the second or third order —*i. e.*, where they are near enough to the trachea to allow of the introduction of a sufficient quantity of the medicinal agent to disinfect them. In deep-seated cavities, and cheesy collections in the smaller bronchi and alveolar spaces, it is questionable whether a sufficient amount of any agent can be introduced through the trachea to have any therapeutic effect. But in large cavities with a free opening into the bronchial tubes, we may, as in the case of bronchiectasis, expect to obtain a certain amount of disin-

fection. Where naso-pharyngeal catarrhs exist, they should always be treated the same as in chronic bronchitis.

In incipient phthisis accompanied by very little bronchial catarrh, where the cough is accompanied by the expectoration of only a small amount of mucus, local treatment with sprays is of but little avail, and it is not worth our while to spend much time or worry the patient with it. These cases are best treated by the use of compressed air or the pneumatic cabinet, and in a very large proportion of them we may hope to render the disease latent. The action of the positively or relatively compressed air is to expand the lungs, to favor the expectoration of the contents of the smaller tubes and, possibly, of the alveoli, and to modify the intrathoracic circulation, as has been explained by Dr. Platt, and more recently, by Dr. Tiegel in an able article in the *New Yorker Medicinische Presse* for April, 1887.

The sittings should be frequent, every day, or every second day, and the pressure, at first slight, say two-tenths to three-tenths of an inch of the barometer, should be gradually increased to one-half or even three quarters of an inch. Ten minutes is usually long enough for each sitting, though in some instances where it is well borne we have prolonged it to twenty and even twenty-five minutes. There is a great difference in the ability of patients to bear the differential pressure. Some experience no difficulty in inhaling under a negative pressure of one-half or three-quarters of an inch for fifteen or twenty minutes, and say that they feel much more benefit from the treatment than when it is lighter, but others soon become fatigued under the pressure of more than one-half an inch, and, on emerging from the cabinet, show signs of great exhaustion. I have met three or four cases in which the pneumatic treat-

ment had to be abandoned because of the exhaustion and thoracic pain following its employment. A safe rule to adopt is never to make the pressure so high, or the sitting so long, that it is followed by a feeling of weariness or exhaustion. Used cautiously in this way it is, I believe, the very best method for the local treatment of incipient phthisis, or of phthisis limited to a small portion of the apex of one or both lungs. When much bronchial catarrh exists in the earlier stages, the introduction of sprays is all important, and the method is precisely the same as for the treatment of chronic bronchitis. After this preliminary treatment, the pneumatic cabinet is used in the way already described.

So far as the introduction of sprays is concerned, the cabinet is not as useful as either of the other methods; for, while the initial expansion of the lung secured by the operation of compressed air is considerable, the subsequent exhalations do not coincide with it, so that, while the patient is in the cabinet and treated by the diminished pressure, though the chest is expanded and the amount of air actually contained in the lungs increased, this increase is rather in the residual than the tidal air. In some experiments conducted by Dr. Platt and myself, we found that a very robust man could exhale more air after a deep inspiration outside the cabinet than in it. While the expansion of the chest was increased by the action of the compressed air, the expiratory contraction was diminished. Of course, this applies only where the rarefaction is continued during the entire sitting, and would not hold good if the patient were made to inspire under diminished pressure and expire under the normal or increased pressure. But after a number of trials, I have not been able to use the cabinet in this way. Mr. Ketchum, the inventor of the cabinet, tells me that

he can operate it in this manner, but possibly, from lack of skill in its manipulation, we have not succeeded in doing so.

With the Evans' inhaler in the treatment of the earlier stages of phthisis, my experience is not so great; as the other methods have proved so satisfactory that I do not generally resort to it. Where it has been used, however, the results have generally been very satisfactory. I believe that its efficacy depends, first upon the effects of the spray on the mucous membrane of the air passages, and, second, upon the salutary influence of the prolonged voluntary attempts at deep inspiration on the part of the patient. Under its use the cough and expectoration are markedly diminished, the patient acquires a gradual expansibility of the chest, and the dyspnœa on exertion is markedly diminished. As the natural result of this, the digestion and appetite improve, the sleep is better, and there is a diminution in fever and increase in weight.

The principles involved in the treatment of more advanced cases differ in no respect from those which we apply in the earlier stages, but certain precautions are to be observed, and less is to be expected in the way of a cure. It is possible, however, in many instances, greatly to improve the general health of the patient by diminishing the expectoration, regulating the pulmonary circulation, and increasing the breathing power. Whether anything can be done in the way of disinfection beyond what we have already alluded to, is very doubtful. It would seem, *a priori*, to be impossible to introduce enough of any antiseptic into the lungs to destroy the caseous foci, disinfect the infiltrated tissues in the neighborhood of the avenues of entrance, and leave enough to prevent a reformation of bacilli during the intervals between sittings. To my mind, the only way in

which the progress of the tubercular invasion can be arrested is by so improving the nutrition of the tissues of the lung as to render them immune to the disease. We know that in the case of tuberculosis, as of other infectious and septic diseases, it is only a certain proportion of those who are exposed to the infection who contract the malady. Not every patient who is operated upon under circumstances which expose him to septic infection contracts pyæmia or septicæmia, and antiseptic surgery is for the benefit of those who are vulnerable. It need not be applied in every case if we had the means of knowing which were susceptible and which were not. So, in the case of tuberculosis, it is only those whose tissues are susceptible to the disease who contract it. And when the disease is present, in the absence of any means for thoroughly destroying the bacilli which already inhabit the lungs, our only resource is to endeavor to render the remainder of the pulmonary tissue invulnerable to their attacks.

In the treatment of advanced cases our first aim should be to cure the bronchitis, or so to diminish it as to lessen greatly the expectoration and the cough. This being done, the pneumatic treatment should be carefully applied, in order to get a better expansion and improved circulation, and an alteration of the action of the trophic nerves. The coarse spray, of course, accomplishes but one of these subjects, while the pneumatic cabinet and the Evans' inhaler act in both ways. If the cabinet is used, the patient should first be treated locally with the coarse spray, and, after thorough cleansing, the entire respiratory tract should be subjected to a moderate negative pressure, with the introduction of some unirritating spray.

After the employment of a number of different formulæ, it has seemed to me and my two colleagues,

Dr. I. H. Platt and Dr. A. H. Buckmaster, that as good results were obtained by the use of a simple alkaline and carbolized solution, as with any of the others; though, in some instances where great irritability is present, a pine needle extract or the fluid extract of hyoscyamus has done better. We used, for some time, a solution of the bichloride of mercury in the strength of 1 to 1000, but it was not as pleasant to the patient as were the others mentioned, and there was no apparent difference in their therapeutic effects, or, if any, it was in favor of the other solutions. Many other formulæ have been used and advised by other observers, but the active principles of all are similar, and as those that we had used acted satisfactorily, it was not thought worth while to multiply them, as no opinion of any value could be formed in regard to the efficacy of any one agent, unless it were used for a long time and in a large number of cases.

Though the effects of the cabinet have been very satisfactory in cases which were not too far advanced, I think that, on the whole, we have been better pleased with the Evans inhaler. This apparatus has the advantage of being very easily employed. It does not alarm the patient, nor does it fatigue him as much as the cabinet. Of course, if the patient is very ambitious, and exerts himself to inspire as deeply as possible for a long time, he may soon become exhausted. But when the cases are well advanced, and the patients greatly debilitated by disease, we do not at first urge them to make any great effort at expansion, but simply allow them to hold the tube in the mouth and breathe comfortably. As they become accustomed to its use, they inhale more deeply, the respiratory muscles are gradually strengthened by exercise, and they may finally become able to make a very effective use of the instrument. We

have not employed the local treatment alone in any cases of advanced phthisis with extensive destruction of the lung, hectic fever, and copious night-sweats, but have always felt obliged to use other internal medication; so that it is impossible to say, in any given case, to what extent the improvement which has occurred is due to any one of the means employed, but it would appear that the use of these local measures is a valuable addition to our ordinary therapeutic resources.

It is particularly important, in using the pneumatic cabinet on this class of patients, not to make the pressure too high, as it appears from our observation that, where portions of the lung are contracting, no matter how strong a pressure is used, the contraction is not overcome, and any dilatation of the chest which is accomplished is at the expense of the non-infiltrated portions. In one instance the contraction of the lung, which was only apparent above the third rib on the left side at the beginning of treatment, extended, in spite of the daily application of the cabinet, so that, after the lapse of six weeks, it had progressed below the nipple and the anterior border had so far retracted that the cardiac pulsations could be felt over the entire precordial region, from the second intercostal space to the apex. Where this contraction goes on in spite of the judicious use of the cabinet, we may conclude that the instrument is doing no good, and it is as well to resort to other methods of treatment.

We have been somewhat surprised to see tabulated in some of the reports on the use of the pneumatic cabinet, cases of acute phthisis in which cures had been effected. It has been our experience that the more acute the disease, the more rapid its onset, the higher the fever, and the greater and more progressive the emaciation, the less can be accomplished,

not only by this, but by any other method of treatment. Indeed, we are unable to report any case which we have diagnosticated as acute phthisis, on which local treatment has had any effect whatever. The patients are generally very weak, feverish, and irritable, and the application of these local measures simply exhausts them.

I would say, in closing, that the success of the local treatment is largely dependent upon the constitutional condition of the patient. Some, who appeared to have a very trifling amount of local disease have gone down very rapidly in spite of all that we could do. This has been particularly observed in alcoholic subjects. In one instance, that of a man twenty-eight years old, engaged in the retail liquor business, whose pulmonary difficulty was limited to the upper half of one upper lobe, and consisted largely of solidification without much apparent excavation, and where good results were confidently expected, treatment was found to be very exhausting, and, in spite of the greatest care, the patient rapidly declined. I have been told by Dr. Jacob Fuhs, through whose courtesy we had the opportunity of seeing him, that he subsequently developed a myelitis followed by paraplegia and rapid dissolution. On the other hand, there have been cases where the disease seemed very far advanced, and extended over a considerable portion of both lungs, which have done well from the start, sometimes very much to our surprise. The difference is undoubtedly dependent upon the constitutional resistance of the patient, and we desire particularly to call attention to this fact, in order to illustrate the principle that it is not well either to abandon any case because of its apparently desperate nature, or to base too hopeful a prognosis upon the slight extent of the local lesion.

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Clinton